

NOTES ON ACARI

Sixth Series. ¹⁾

BY

Dr. A. C. OUDEMANS.

(With Plates I, II, III.)

1. *Caenonychus* nov. gen.

(καυρός, singular, ὀνυξ, claw).

(With Plate I, fig. 1—8).

This genus belongs to the *Eupodinae*. The creature is a very singular one, as it has only *one* claw, a phenomenon which, amongst the *Thrombidiidae*, occurs only in certain species of the genus *Myobia*, which, however, belongs to the *Cheyletinae*. Further under each lip of the genital aperture there are 3 suckers, whereas in the *Eupodinae* hitherto the number was 2.

2. Key to the genera of *Eupodinae*.

- | | | |
|----|---|---|
| 1. | { | Body black, sometimes with red spots; legs and rostrum red. 2 |
| | | Body brown, yellow, rose or white; legs rose or flesh-coloured. 3 |

1) The Ist Series app. 15, I, 1897 in the Tijds. v. Ent. v. 39, p. 175—187.

The IIId Series app. 5, IX, 1900 in the Tijds. v. Ent. v. 43, p. 109—128.

The IIIId Series app. 30, XI, 1901 in the Tijds. der Ned. Dierk. Ver. ser. 2, v. 7, p. 50—88.

The IVth Series app. 18, VII, 1902 in the Tijds. der Ned. Dierk. Ver. ser. 2, v. 7, p. 276—311.

The Vth Series will app. in the Tijds. v. Ent. v. 45, p. 123—150.

The VIIth Series app. 31, X, 1902 in the Tijds. d. Ned. Dierk. Ver. ser. 2 v. 8, p. 17—34.

The Series are independent from one another.

Tijdschr. v. Entom. XLVI.

- | | | | |
|----|---|---|-------------------------------|
| 2. | { | Anus ventral | Penthalodes Murray. |
| | | Anus terminal | Halotydeus Berlese. |
| | | Anus dorsal | Penthaleus C. L. Koch. |
| 3. | { | Legs 1 at least twice longer than
body | Linopodes C. L. Koch. |
| | | Legs 1 scarcely longer than body,
or shorter | 4 |
| 4. | { | Femur 4 very thick. | Eupodes C. L. Koch. |
| | | Femur 4 not thick | 5 |
| 5. | { | Mandibles chelate. | Poecilophysis Cambr. |
| | | Mandibles not chelate; movable
finger falcate; fixed short,
conical | 6 |
| 6. | { | 6 genital suckers. | Caenonychus Oudms. |
| | | 4 genital suckers. | Ereynetes Berl. |
| | | 0 genital suckers. | Tydeus C. L. Koch. |

3. *Caenonychus fallax* Oudms., nov. sp.

(With Plate 1, fig. 1—8).

Colour unknown. The specimen, preserved in spirits, was white. The colour may have been rose, or yellowish, or white. *Length* 275 μ .

Skin provided with very fine wrinkles, except a space between the eyes, bearing 12 hairs. The wrinkles of the dorsum generally run transversally; those of the ventral face generally longitudinally; those of the legs *longitudinally*!

Dorsal face (Fig. 1). On the cephalothorax there is a dorsal shield, a space, the contours of which are not distinct, but which is not wrinkled, whilst the whole body and legs moreover are wrinkled. This space bears 12 hairs: 4 long sensorial ones, of which the anterior are directed forward, the posterior hindward. Two eyes flank this shield. On the shoulder there is a distinct hair.

A central portion and the posterior third part of the abdomen bear short stiff hairs.

Ventral face (Fig. 2). Epimera 1 and 2 free; epimera 3 and 4 contiguous. On coxa 3 a feathered hair. The genital and the

anal apertures are surrounded by minute hairs. The genital aperture is shut by two lips, under each of which 3 suckers are visible.

Legs. Tydeus-like, with short hairs, a sucker and *one* claw.

Fig. 3 shows one of the sensorial hairs on the cephalothorax.

Fig. 4 one of the stiff abdominal hairs.

Fig. 5 a palp.

Fig. 6 represents the tongue.

Fig. 7 shows us the distal end of a tarsus with the praetarsus provided with a sucker and *one* claw.

Fig. 8 is the praetarsus with sucker and claw, seen with 2500 linear magnifying powers. No trace of a pulvillum!

Habitat; in moss.

Patria: Netherlands.

4. *Thrombidium novum* Oudms., nov. sp.

(With Plate 1, fig. 9—19.)

This larva was found by Mr. H. P. KUYPER in numerous specimens on various kinds of Diptera, swarming over *Urtica dioica*.

Larva. Length of newly born larva 200 μ . without, and 280 μ . with head.

The body shows a distinct segmentation as well on its back (figs. 9 and 10) as on the belly (fig. 11); seven segments are discernable. The *first* segment bears the first pair of legs, the eyes, the pseudostigmata and the dorsal plate or shield. The *second* segment 4 hairs and the second pair of legs. The *third* segment four hairs and the third pair of legs. The *fourth* segment four hairs and the place where the fourth pair of legs will appear. The *fifth* segment four hairs and the anus. The *sixth* and *seventh* segment four hairs each.

The demarcation between the segments is affected by folds in the skin. These folds follow exactly the very fine wrinkles of the skin. The most remarkable segment in the first. Here we observe on the dorsal side the four eyes, of which the foremost pair is perfectly *black*, and the second pair *brownish black*. They are covered by a high convex cornea. Further the dorsal plate or shield,

which in this species is triangular, with top turned forward. The top of this triangle (fig. 12) reaches almost the level of the pseudostigmata. The shield itself is wrinkled, not smooth, and its wrinkles are still finer and less observable than those of the other skin. The shield bears two minute hairs and a fifth eye, with *brownish-purple* pigment and a distinct cornea. I consider these three kinds of eyes useful to the animal to discern three kinds of light or warmth. The pseudostigmata are best seen in very young larvae, in which they are placed so, that we look *in* the cup.

The pseudostigma is oval, slightly concave, in very young larvae turned upward (fig. 10), in older larvae turned backward, so that in this instance it is very difficult to discern their oval and concave structure. The *pseudostigmatic organ* is long, shaped like a hair.

The maxillar *palp* has four free joints. The third joint ends in a bifid claw (Fig. 13); the fourth, which is planted on the inner side of the third joint, ends in a broom of at least five claw-like hairs. The bifid claws and the claw-like hairs are *brick-red*.

The *mandibles* end in claw-like organs which are brick-red too.

The *hypopharynx* or *lingua*, which was only visible in one of the more than fifty specimens I saw, does not show (fig. 10) any joints as in *Thromb. fuliginosum*.

The «urtrachee» is large, situated between the first and second pairs of legs (fig. 11). The sack is on its base surrounded by a chitinous ring (fig. 14). This ring may become oblong (fig. 15), enclosing exactly the oblong-compressed bladder.

With low powers it seems that the animal is monodactyl. It is however tridactyl. Fig. 16 and 17. represent the distal end of tarsus 1; fig. 18 of tarsus 2, and fig. 19 of tarsus 3, drawn under 2800 linear magnifying powers. The middle claw is at least 15 or 20 times stronger than the almost invisible lateral ones. The lateral claws of the 2d pair (fig. 18) are a third smaller than the middle one.

Habitat: on Diptera.

Patria: Netherlands.

5. Key to the species of *Thrombidium* F.*Larvae.*

1. { Two dorsal shields *Thr. holosericeum* (L.)
 { One dorsal shield 2
2. { Dors. shield, subquadrangular . . 3
 { Dors. shield triangular *Thr. novum* Oudms.
3. { On each side one eye *Thr. russicum* Oudms.
 { On each side two eyes 4
4. { Psdst. org. filiform *Thr. gymnopteronum* (L.)
 { Psdst. org. clavate (Berl. Tromb.
 Tab. XVI.) *Thr. berlesei* Oudms.

6. *Tarsonemus soricicola* Oudms., nov. sp.

(With Plate 1, fig. 20 and 21).

Of this species only the male is known to me.

I found it among other parasites collected in Febr. 1898 by Mr. S. A. Poppe on a *Sorex vulgaris* at Vegesack.

As to the *male* (Fig. 20 and 21), *Tarsonemus soricicola* is closely related to *T. floricola* C. et F. and *T. brevipes* Sicher et Leonardi. Length 150 μ .

The following characteristics may be mentioned.

The shape of the body is elongate, like that of *T. brevipes*. The abdomen, however, is widest posteriorly, behind the implantations of the hind-legs, whilst the known species are widest before these legs, nay even quite behind the shoulders. The fore-legs are short and slender, and their tibiae bear quite distally a short thick, clavate olfactoric hair. The epimera of legs 1 form an Y. Those of legs 2 first bend inward and then obliquely backward and inward; they do not reach each other and do not meet the Y. The hind-legs are implanted far more forward than in any known species, so that the abdomen projects a good deal above them. The epimera of legs 3 and 4 join anteriorly. The legs 3 are long and slender, but their ambulacra do not extend beyond the claw

of legs 4. Legs 4, of which I have drawn the left one apart, is provided with a hyalin blade on its inner side, but this is situated on the distal end of the 2nd joint and resembles a cat's claw, forming pincers with the third joint. It is situated somewhat dorsally, so that when the creature is viewed on its ventral side, and when the 3d joint is bent inward (the usual position), this crooked hyalin blade is not observable. The 3d joint bears a tactile hair, as long as the whole leg.

Habitat: *Sorex vulgaris*.

Patria: Germany.

7. *Eremaeus novus* Oudms., nov. sp.

(With Plate 2, fig. 22.)

This species is closely related to *E. clavipectinatus* Michael, *subtrigona* Oudms., *pectinata* Michael, and *subpectinata* Oudms. It differs from *E. clavipectinatus* in having lamellae; from *subtrigona* in having no pectinated membrane on the pseudostigmatic organ; and from the two other *E.* in having a fusiform pseudostigmatic organ.

Colour light brown.

Length about 300 μ .

The *cephalothorax* is nearly triangular, with convex sides, and a rounded top. — *Pseudostigma* round, with semilunar inner covering, as in *E. clavipectinatus* Michael, large, distinct. — *Pseudostigmatic organ* with smooth peduncle and fusiform head; the organ is directed upward and forward; the peduncle is proximally bent three times to and fro; the fusiform head ends in a hair and is provided on its outside with 7 pectinations. The real *lamellae* run from the pseudostigmata inward toward the lamellar hair, but already halfway they are truncated abruptly. Further there are two interlamellar chitinous bars, running from the anterior edge of the abdomen toward the lamellar hairs but not reaching them, and being provided on their outside with a chitinous hook, running round the interlamellar hair. Rostral, lamellar and interlamellar *hairs* very thin.

The *abdomen* is suboval, somewhat truncated anteriorly, pointed posteriorly. — The *dorsum* is provided with 5 pair of very thin hairs; the posterior margin with 3 pair of such hairs, crooked upward. The anterior margin of the abdomen is dark brown coloured; from this band two dark chitinous bars run hindward, not farther than the thickness of a femur.

The *legs* are rather slender but with swollen femurs, tibiae and tarsi. When the hind legs are stretched they scarcely reach the posterior end of the abdomen. The tibiae 1 and 4 are provided with a tactile hair; the tarsi 2 with a pectinated hair. *Claws monodactyle*. — On the sides of the cephalotorax the coxae 1 are visible for a small part. — The tectopodia 1 are very distinct. —

Underside. Nothing particular. The apodemata reach the median line; the genital and anal openings are subquadrangular; the latter much larger than the former.

Habitat: in moss.

Patria: Netherlands.

8. Emendation of the key to the species of *Eremaeus*.

(Das Tierreich, Oribatidae, p. 44.)

- | | | | |
|------|---|--|---------------------------------|
| 21. | { | Psstg. org. clavate or fusiform,
with a smooth peduncle | 21. a. |
| | { | Psstg. org. slender | 21. c. |
| 21a. | { | No lam. nor transl. | <i>E. clavipectinatus</i> Mich. |
| | { | Lam. present | 21 b. |
| 21b. | { | Psstg. org. without pectinated
membrane. | <i>E. novus</i> Oudms. |
| | { | Psstg. org. with pectinated mem-
brane | <i>E. subtrigenus</i> Oudms. |
| 21c. | { | Psstg. org. very long, with a few
pectinations upon the slightly
thickened middle. | <i>E. pectinatus</i> Mich. |
| | { | Psstg. org. long, not thickened,
with 3 or 4 pectinations quite
distally. | <i>E. subpectinatus</i> Oudms. |

9. *Nanacarus* Oudms., nov. gen.

(With Plate 2, fig. 23—28).

Under the name of *Hypopus minutus*, nov. sp., I described a nympha in the Tijdschrift der Nederlandsche Dierkundige Vereeniging, ser. 2, v. 7, p. 85. Two specimens were under my observation; one was caught by Prof. Dr. K. Knuth on *Xylocopa* (*Koptorthosoma*) *tenuiscapa* Westw., the other by Mr. S. A. Poppe on *Vesperugo serotinus* (Schreb.)

In a tube with parasites, collected by Mr. S. A. Poppe on *Sorex vulgaris* L. at Vegesack near Bremen, I found a male and two females of the same species. Thier characteristics induce me to place the animal in a new genus, related to *Hericia* Can. It differs from this genus specially in the presence of a demarcation between thorax and abdomen.

I have called the new genus *Nanacarus* referring to the extreme minuteness of the species.

10. *Glycyborus* Oudms., nov gen.

For the species *Glycyphagus plumiger* C. L. Koch, *palmifer* Fum. et Rob., *canestrinii* Arman.; and *pterophorus* Berl., which are distinguished from *Gl. intermedius* Can., *peregrinans* Berl., *ornatus* Kram., *spinipes* C. L. Koch and *domesticus* de Geer, by having a distinct demarcation between cephalothorax and abdomen and flat feather-like hairs, whilst the others lack these characters, I propose to create a new genus: *Glycyborus*; βόρος = φάγος = eater. I take *Gl. plumiger* C. L. Koch as the type of the genus.

11. Genus *Nodipalpus* Karpelles.

Wenn we read attentively what Karpelles (Math. u. Naturw. Bericht. aus Ungarn, XI, 129) tells us of his Genus *Nodipalpus* and of his *Nodipalpus ulmi* nov. sp., and when we compare carefully his drawing of this species with those which Michael presents us of the species of *Histiostoma* (= *Anoetus* Duj.), we must unvoluntarily come to the conclusion that *Nodipalpus* = *Anoetus*, and that we must adopt the species *Anoetus ulmi* Karpelles.

12. Key to the tribus and genera of Tyroglyphinae.

1. { Claws of the legs normal (i. e.
sessile) 2
1. { Claws of the first two pair of
legs born on long peduncles 3
2. { Mandibles normal (i. e. chelate) **Tyroglyphae.**
2. { Mandibles saw-like or knife-like,
both in form and action . **Histiostomae.**
3. Only one tribus **Lentungulae.**

Tyroglyphae.

1. { Female without copulation-tube 2
1. { Female with projecting copula-
tion tube 15
2. { Demarcation between Cepthl.
and Abd. 3
2. { No demarcation between Cepthl.
and Abd. 11
3. { ♂ without anal suckers. . . 4
3. { ♂ with anal suckers. . . 5
4. { ♀ without genital suckers . . **Nanacarus** Oudms.
4. { ♀ with genital suckers . . . **Saproglyphus** Berl.
5. { No sternum **Mealia** Trt.
5. { Sternum present 6
6. { Posterior margin of Abd. normal 7
6. { ♂ posterior margin of Abd. with
a projecting blade. . . 10
7. { Legs 1 normal 8
7. { Legs 1 much thicker than the
other legs; femur 1 spurred 9
8. { With ambulacral suckers . . **Tyroglyphus** Latr.
8. { Without ambulacral suckers . **Hypopus** Dujard.
9. Only one genus **Aleurobius** Can.
10. Only one genus **Histiogaster** Berl.

11. { Mouth organs distinctly visible
from the dorsal aspect12
11. { Mouth organs hidden by a dorsal
hood14
12. { ♂ Epimera 2 not joined to the
sternum **Trichotarsus** Can.
12. { ♂ Epimera 1 and 2 joined to
the sternum and to each
other, forming a continuous
skeleton13
13. { No genital suckers in either sex **Hericia** Can.
13. { Genital suckers present in both
sexes **Carpoglyphus** Robin.
14. { ♂ genital aperture between
epimera 3 and 4 **Fusacarus** Michael.
14. { ♂ genital aperture in front of
epimera 1 **Chortoglyphus** Berl.
15. { Demarcation between Cepth.
and Abd.16
15. { No demarcation between Cepth.
and Abd.17
16. { Demarcation on the usual
place; hairs on notogaster
feathery or leaf-like . . . **Glycyborus** Oudms.
16. { Demarcation far forward; Cepth.
very small; hairs on noto-
gaster spinous **Labidophorus** Kram.
17. { ♀ Epimera 1 joined together;
copulation-tube conspicuous,
marginal. **Glycyphagus** Hering.
17. { ♀ Epimera 1 separate; copulation
tube inconspicuous, dorsal . **Dermacarus** Haller.

Histiostomae.

Only one genus **Anoetus** Duj.

Lentungulac.

Only one genus **Lentungula** Michael.

13. Key to the species of *Hypopus* Duj.

As *Hypopus minutus* proves to be the nymph of *Nanacarus minutus* Oudms. (vide above p. 8), I present here an emendated key to the species of *Hypopus*. My previous key, printed in the *Tijdschr. d. Ned. Dierk. Vereen.*, ser. 2, vol. 7, p. 86, herewith is annuled.

- | | | | |
|------------------|---|---------------------------------|-------------------------------|
| 1. | { | Legs 1 and 2 without strong | |
| spines | | H. crassipes (Haller). | |
| | { | Legs 1 and 2 with strong spines | 2 |
| 2. | | Heterom. ♂ with 2 little spines | |
| | { | on tarsi | H. trouessarti (Berl.) |
| | | Heterom. ♂ with strong spines | |
| | { | on all the joints of the legs | H. spinatarsus (Herm.) |

14. *Nanacarus minutus* (Oudms.).

(With Plate 2, fig. 23—28.).

Nymph. See *Tijdschrift der Nederlandsche Dierkundige Vereeniging*, ser. 2, v. 7, p. 85, tab. III fig. 55, 56.

Female. Length 246 μ . with head, 221 μ . without head. *Shape* *Acarus*- or *Hypopus*-like. — *Colour* white or pale. Fig. 23 shows us the *dorsal* aspect of the animal. The head is triangular, the thorax nearly trapezoidal, with straight front and base, and with sides which are three times sinuated outward. There are two vertical hairs and two pairs on the hinder part of the thorax, of which the inner pair is small, and the outer pair almost as long as the length of the thorax. This outer pair is directed outward and a little forward. The abdomen is twice longer than the thorax, has parallel sides and a perfectly rounded posterior margin. It bears four rows of rather small hairs: two marginal rows of four hairs each, and two dorsal rows of four hairs each. The skin is smooth. One of the females contained an egg, the outlines of which I have drawn by a dotted line. — Fig. 24 represents the *ventral side* of the creature. The distance between legs 2 and 3 and between legs 3 and 4 is rather large, so that the 4th pair of legs is inserted

far more backward than in most other species of *Tyroglyphinae*. The genital aperture is situated between the coxae 4. It is shut by two genital covers, pointed anteriorly, rounded posteriorly, each provided with one small hair. There are *no* genital suckers. The epimera 1 form a V. All the other epimera are free. On each side of the anus there are two hairs, a small one and a long one, the length of which equals the length of the abdomen.

The *mandibles* are chelate.

The *maxillae* (Fig. 25) are blunt and have a L-shaped incision distally. The maxillar palps are bi-articulate; their first joint has a hair; their 2d joint is hairless and rounded distally.

The legs are short (Fig. 23). The fore-legs are a little thicker than the hind-legs. The tarsi 1 and 2 are provided with a spool-shaped olfactory hair (Fig. 26). The tarsus 4 has a tactile hair as long as the leg 4. (Fig. 23).

Male. The male resembles the female, but it is smaller. Its *length* is 192 μ . with head, 172 μ . without head. The genital aperture (Fig. 27) is, like in the female, situated between the coxae 4; the genital cover is a nearly triangular one with its top directed forward. The penis is a very little ball, with a little rod forward. There are *no* genital suckers and *no* anal suckers. The legs 3 and 4 are stronger than in the female (Fig. 28) and end in a strong claw.

Habitat: *Nylocopa* (*Koptorthosoma*) *tenniscapa* Westw., *Vesperugo serotinus* (Schreb.), *Sorex vulgaris* L.

Patria: Java, Germany.

15. *Cerophagus* Oudms., nov. gen.

(This n^o. 15 is written 15 June 1902).

In may 1901 I found a hypopus on *Bombus*.

This hypopus having rounded edges, both of the cephalotorax and abdomen, and *not* being a hypopus of *Trichotarsus* Can., *Laelidophorus* Kram., or *Dermacarus* Haller; the hypopi of *Glycyphagus* being at that time unknown; I considered my hypopus as one of a species of *Glycyphagus*.

On the 1st of November 1901 these my Notes VI Series were written and the species described as *Glycyphagus bomborum*.

In Januari 1902 I received from my friend Mr. MICHAEL of London a copy of his *British Tyroglyphidae*, vol. I, in which 2 rudimentary hypopi of *Glycyphagus* are described and delineated. These hypopi having rounded edges too, I was strenghtened in my opinion, and shortly described my new finding in the (Dutch) *Entomologische Berichten*, p. 20. (1 March 1902), again under the name of *Glycyphagus bomborum*.

But a fortnight ago I received a bottle with many thousands of hypopi of a very *Glycyphagus* which I will describe afterwards. (Notes, XI or XII); all were sharpened. And therefore I don't believe that my creature is a hypopus of a species of *Glycyphagus*, but I consider it as one of a species of an unknown genus, which I will call *Cerophagus* (wax-eater).

16. Key to the genera of Tyroglyphinae.

Hypopi.

- | | | | |
|--|----|---|---|
| | 1. | { | Abdomen without sharp edges 2 |
| | | | Abdomen with sharp edges; the lateral margins can be sufflexed ventrally 6 |
| | 2. | { | Ventral side without any trace of suckers or claspers: degenerated hypopi of <i>Glycyphagus</i> , never free. |
| | | | Ventral side with suckers or claspers; animals free living 3 |
| | 3. | { | Behind the anus a sucker-plate 4 |
| | | | Behind the anus two claspers 5 |
| | 4. | { | All the legs equal in armature and in hairs of tarsi Cerophagus Oudms. |
| | | | Legs 4 quite otherwise Trichotarsus Can. |
| | 5. | { | Under the claspers no sucker Labidophorus Kram. |
| | | | Under each clasper a pedunculated sucker Dermacarus Haller. |

- | | | | |
|-----|---|--|----------------------------|
| | { | Ventral side without any suckers | |
| 6. | | at all | Acotyledon Oudms. |
| | { | Behind the anus a sucker plate. | 7 |
| | | No eyes | 8 |
| 7. | { | Two eyes | .13 |
| | | All the legs equal in length, short
and thick; legs 3 and 4 usually
turned backward. | 9 |
| 8. | { | All the legs slender; legs 3 and 4
shorter than 1 and 2, usually
turned forward | .12 |
| | | Four pair of suckers after one
another | Aleurobius Can. |
| 9. | { | Sucker-plate with 8 suckers ar-
ranged 2, 4, 2. | .10 |
| | | Anterior top of Cepth. hairless | Tyroglyphus Latr. |
| 10. | { | Top of Cepth. with 2 minute
hairs | .11 |
| | | Epimera 1 very short, joined to
the sternum; epimera 3 and 4
joined with a large bow to one
another | Hypopus Dugès. |
| 11. | { | Legs 1 without epimera; sternum
free; epimera 3 and 4 free . . . | Glycyphagus Hering. |
| 12. | | Only one genus. | Anoetus Duj. |
| 13. | { | Only one genus. | Histiogaster Berl. |
| | | | |

17. **Cerophagus bomborum** Oudms., nov. sp.

(With Plate 2, fig. 29 and 30).

Nympha hypopialis. Length varying from 196 to 217 μ . Colour white. Shape remembering that of *Labidophorus talpae* Kram.

Dorsal face. (Fig. 29). The animal is nearly pentagonal in shape, one of the angles of the pentagon directed forward. There is a distinct separation of cephalothorax and abdomen; the former is triangular; the latter nearly quadangular. Both are protected by a shield with a beautiful marking. This consists in oval spots sur-

rounded by numerous punctulations. The posterior quadrangle has rounded hind-corners, a rounded hind-margin and a median incision, which continues itself for a small part on the animal's back. — The anterior margin of the posterior dorsal shield has no markings and lies over the anterior dorsal shield. — The only and exceedingly minute hairs of this side are: one just in the middle of the anterior margins of the cephalothorax, and one on each shoulder.

Ventral side. This is quite smooth, polished, having no shields, but only 6 pair of very minute hairs (see my fig. 30). The sense-organ, comparable with the mentum of the *Parasitidae*, is present, but small, and confused for the greater part with the ventral surface of the head. It bears two hairs which reach beyond the tip of the rostrum. This is provided with two small rostral hairs. The epimera 1 are fused to form a Y. From the outer and posterior corner of the coxa 2 a chitinous bar runs toward the epimeron 3, which ends in a Y. There are two anal suckers before the sucker-plate. This bears 6 suckers, of which two are large, each with two central little circles. Two smaller ones stand behind, and two other smaller ones to the sides and a little backward of the large ones. Before and outward of the large ones there is an indication of a fourth pair of suckers. Behind the sucker-plate the incision and the posterior margin of the body are dark brown coloured.

Legs. The legs are nearly equal in size, being half as long as the animal's greatest breadth. The two fore pairs are slightly thicker than the two hinder pairs. Except one or two hairs, the legs — except the tarsi — are hairless. All the tarsi have one strong claw and four beautifully curved lanceolate hairs. In fig. 29 you may further observe that the tibiae 1 and 2 and the tarsi 3 and 4 bear a tactile hair as long as the leg.

Habitat: *Bombus terrestris*.

Patria: Netherlands.

18. *Glycyphagus fuscus* Oudms.

(With Plate 2, fig. 31—32, and 3, fig. 33—37).

Male. Length 280 μ . — Colour brown, therefore immediately

recognizable between the white-coloured other meal-acari. — *Dorsal side* (Fig. 31) smooth, polished; two rostral hairs, two vertical hairs; two hairs on each shoulder; two hairs on each side between the vertical- and shoulder-hairs; five marginal hairs on each side; two dorsal longitudinal rows of five hairs each, of which the third and fourth pair are more remote from each other than the first, second and fifth pair. Posteriorly the abdomen has a distinct superanal impression in which two hairs are planted. The whole dorsal face is well chitinized.

Ventral side (Fig. 32). The space between the legs is stronger chitinized than the venter, darker than the latter, remembers strongly of the same space in *Oribatidae*, and bears 8 minute hairs. On the venter the genital opening is situated behind the fourth pair of legs, oval in circumference, shut by an oval valvule, and flanked by a minute hair. Behind the genital opening the longitudinal anal slit is visible between two weak anal valvules. Just before and behind the anal slit two minute hairs. — Fig. 33 is an enlarged figure of the genital opening. On sinking the tube of the microscope the penis and the genital suckers become visible. These are small; the penis is directed backward, and more or less poniard-shaped, the blade being flanked by two pins.

Legs. The legs 1 and 2 are planted at the edge of the body. They are of the same type. The femur bears a pectinated hair distally and inward; the genu one proximally and outward; the tibia in the middle and outward, and one long tactile hair. The 3d and 4th legs are planted near the edge, so that their implantation is not visible when the animal is viewed on its dorsal face. The 3d leg is thinner than the 1st and 2nd. Its tarsus bears (fig. 32) ventrally, proximally and inward a pectinated hair. The 4th leg is thicker than the others, serves probably to clasp the female in copulation. Its tibia bears ventrally, distally and inward a pectinated hair.

Female. *Length* about 400 μ . *Colour* like that of the male. *Dorsal side* (Fig. 34) like that of the male. The small copulation tube is distinctly visible in the abdominal impression. — *Ventral side*

(Fig. 35). The epimera 1 form a V. Curious is the genital opening, shut by two valvules, resembling strongly those in *Oribatidae*. On each genital cover a lunular chitization posteriorly is visible, the signification of which is not clear to me. In fig. 36 I have drawn the genital covers; when sinking the tube of the microscope, two genital suckers are scarcely visible outside of the lunular chitizations; they seem to be very small, rudimentary. Fig. 37 gives us a side view of the animal. — *Legs*. The legs of the female, especially those of the 3d and 4th pair are much more *Glycyphagus*-like than those of the male. Curious is the cup-shape of the trochanter, femur, genu and tibia of the fore-legs. The femur 1 bears distally a pectinated hair (fig. 35); the genu 1 two (fig. 34) and the tibia 1 one (fig. 35). The femur 2 one (fig. 34) and the tibia 2 one (fig. 34). The legs 3 and 4 are slender and of the type of *Gl. domesticus*.

Habitat: in meal.

Patria: Netherlands, France.

Remarks. 1. Hereabove I have already mentioned a few features which remember us of *Oribatidae*. There are more; viz.: the cup-shaped articles of the legs in the female, and a forming of so-called *tectopodia* in the female (see fig. 35).

2. Kramer has first described a bifid feathered hair between the coxae 1 and 2 in his *Glycyphagus ornatus* (1881, in Z. f. d. ges. Naturw. v. 54. p. 435). Then Michael delineated the same of *Gl. platygaster* (1886, in J. Linn. Soc. v. 19. p. 275, t. 34). I have observed this hair in more species of *Tyroglyphidae*. Kramer thought it protecting a longitudinal slit or stigma. I think Kramer is partly wrong; the hair itself, or the thin skin covering the slit may breath, but there is no hole. The above described species (see fig. 35) has a hair between the head and the coxae 1 and between coxae 1 and 2, and this hair is bent ventrally and backward.

3. This is the «acarieu (fig. 28 et 30), qui n'appartient à aucun des genres précédents» of Troupeau (Bulletin de la Soc. d'Angers v. 6, 7, 1876—77, fasc. 2, paru 1878, p. 115).

19. Key to the species of *Glycyphagus* Hering.

- | | | | |
|---------------------------|---|-------------------------------|--------------------------------|
| 1. | { | ♀ with a hyalin blade above | |
| the copulation-tube . . . | | G. peregrinans Berl. | |
| | { | ♀ without such a blade . . . | 2 |
| 2. | | Body dark brown . . . | G. fuscus Oudms. |
| | { | Body white or pale . . . | 3 |
| 3. | | ♂ legs 1 and 2 with a comb | |
| | { | on tibia | G. ornatus Kramer. |
| | | ♂ tibia 1 and 2 without such | |
| | { | comb. | 4 |
| 4. | | Tarsi villous | G. spinipes C. L. Koch. |
| | { | Tarsi not villous | 5 |
| 5. | | Tibia 1 and 2 with one long | |
| | { | setiform and two shorter | |
| | | hairy hairs | G. domesticus de Geer. |
| | { | Tibia 1 and 2 without the two | |
| | | shorter hairs | G. intermedius Can. |

20. *Tyroglyphus fucorum* Oudms. nov. sp.

(With Plate 3, fig. 38 to 40).

Hypopus. *Length* varying from 210 to 290 μ ; breadth varying considerably in the same individual, as it is able to bend downward and inward its sides. Generally it has the form delineated in fig. 38 and 39, but when even slightly pressed by the covering-glass it becomes very broad (fig. 40). *Colour* brown. *Shape* oval, with the top directed backward, but with a triangular slip on the anterior base.

Dorsal side (Fig. 38). Cephalothorax small, about one fifth of the animal's total length. Line of demarcation between cephalothorax and abdomen convex forward. The skin is quite polished, no trace of punctulations, etc. On the cephalothorax I could discern 3 pair and on the abdomen 9 pair of minute hairs. I am convinced that with the position of these hairs, how minute they may be, it is possible to determine the species. There is a shoulder-hair and backward a marginal hair behind coxa 3 and behind coxa 4. There are two longitudinal rows of six hairs each. On the cephalothorax

two hairs are implanted in the middle, and two pairs of hairs are placed more marginal, but *before* the level of the middle-hairs.

Ventral side (Fig. 39). This is partly protected by two shields; both are punctulate. The anterior consist of the fusion of the so called epimera of the four fore-legs, between which the narrow real epimera are visible. The posterior shield lies between the coxae 3 and 4. The demarcation between these two shields is distinct. On its level there are two marginal hairs. There are two suckers before the sucker-plate. This bears 8 suckers, two of which are large and provided with two central little circles each; the six others are small. One pair of these stand before and inward, one pair before and outward, and one pair before and backward of the large suckers. — The tactil organ behind the head, or the mentum, is lozenzy and provided with 6 hairs, of which the two foremost extend beyond the anterior margin of the cephalothorax. Two small rostral hairs do not reach it.

Legs. The 8 legs are equal in size and shape. The fore legs (fig. 38) bear a tactil hair on their tibia and four leaf-like hairs on their tarsus. The tactil hair of leg 1 is longer than that of leg 2, equaling the leg in length. The distal and outward leaf-like hair of legs 1 and 2 ends in an almost circular piece; all the other leaf-like hairs, also those of legs 3 and 4 end in a lanceolate blade. Genu and tibia bear a little hair or spine on each side. On the ventral side (Fig. 39) the coxa and femur 1 and 2 have a long tactil hair. The tarsi 3 and 4 bear a long tactil hair; that of the tarsus is scarcely longer than leg 3; that of tarsus 4 equals the animal's breadth.

Habitat: On *Bombus terrestris*. Probably the adult lives in the nests of *Bombus*.

Patria: Netherlands.

21. Key to the species of *Tyroglyphus*.

Hypopi.

- | | | |
|----|-----------------------------|---|
| | With two aliform appendages | |
| 1. | { | at corners of cephalothorax T. krameri Berl. |
| | | Without such 2 |

- | | | | |
|----|---|--------------------------------|------------------------------|
| | { | On the anterior Abd. a marking | |
| 2. | { | like a trapezium. | T. queenslandiae Can. |
| | { | No such marking. | 3 |
| | { | A minute sucker near coxae 2 | |
| 3. | { | and 3 | T. mycophagus Mégn. |
| | { | No suckers there. | T. fucorum Oudms. |

According to Berlese **T. agilis** Can. has hypopi similar to those of **T. mycophagus** Mégn. This is very doubtful.

22. *Anoetus spiniferus* Michael.

(With Plate 3, fig. 41 and 42.)

I found this hypopus among other parasites, picked up by Mr. S. A. POPPE at Vegesack, in 1898, on a *Sorex vulgaris*. As MICHAEL could not describe it in details, these follow here.

It is a beautiful creature. Its length is about 260 μ . Its shape is elongate, even when the lateral margins are extended, the more when they are sufflexed ventralward, which is usually the case, when the creatures are preserved in spirits.

The *dorsal side* (Fig. 41) of the abdomen is polished, punctulated, and provided with almost invisible minute hairs which are arranged in four longitudinal rows. The marginal rows have 5 hairs, the dorsal ones 4 hairs each, of which the 4th pair may be reckoned in the marginal rows too. The cephalothorax is polished, without any punctulation, and provided with 2 pair of minute anterior marginal hairs. The tactile organ, comparable to the mentum of *Parasitidae* (*Gamasidae*) is long and projects a good deal beyond the anterior margin of the cephalothorax.

The *ventral side* (Fig. 42) shows the following particulars: The epimera of legs 1 form an Y, of which the trunk extends far backward till the line behind the coxae 3. The epimera 2 join the epimera 3, and these meet in the median line with the sternum. The epimera 4 meet too in the median line with the above mentioned trunk. The proximal ends of the epimera 4 are united by a chitinous bar which touches the anterior border of the genital aperture. Here again a short chitinous bar projects forward. There

are 4 distinct, minute genital suckers. Behind the coxae 1 there is a pair of minute suckers; so too there is a pair of minute suckers before the junction of epimera 4 in the median line. Behind the genital aperture and a little to the sides of it there are two small suckers. The sucker-plate is heart-shaped and provided with 8 suckers of which the foremost pair is large and perfectly round. Before this pair of suckers there is a minute chitinous spot. Behind the pair of suckers the anus is visible. Then follow the 3 pair of other suckers which are oval in shape, and which form together a long hexagon, lying transversally; the long axes of the oval suckers lie perpendicular on the transverse diameter of the hexagon.

The *legs* are remarkable by their having only a very few hairs and *no* pedunculated spoon-shaped suckers. The olfactory hairs at the distal end of the tibiae is rather large and rod-like. Leg 4 has an almost invisible claw.

Habitat: Sorex vulgaris.

Patria: Germany, England.

23. *Anoetus neglectus* Oudms. nov. sp.

(With Plate 3, fig. 43 and 44.)

Hypopus. Length about 290 μ . — Colour white. — Shape resembling *Anoetus julorum* (C. L. Koch), however, it is distinguished from it by its abdomen being less oval and wider, and by its legs being shorter.

Dorsal side (Fig. 43). The demarcation between cephalothorax and abdomen is very distinct. The former is visible as a band of equal width throughout, bearing 4 small hairs; the latter is shield-shaped, but has sufflexed sides (see fig. 44). There are only a few minute hairs on the dorsum, viz.: 14 along the margin, and three pair of dorsal hairs. Moreover the dorsum is polished.

Ventral side. (Fig. 44). The epimera 1 form an Y. The epimera 2 are connected by a transversal bar, which at the same time joins the epimera 3. From this medial transversal part a median longitudinal bar projects backward and passes the coalesced epimera 4.

The sucker-plate is large and provided with 8 suckers in 3 transverse rows. The *first* row consists of two great ones before the anus. The *second* row has two great ones flanked by two small ones behind the anus. The *third* row shows two smaller ones. — Moreover there are six other *ventral suckers*, viz. one pair before the proximal end of epimeron 2; one pair before the middle of epimeron 4, and one pair to the sides of the genital aperture. When the tube of the microscope is lowered, we observe moreover the 4 small genital suckers.

Legs. The remarkable features are: The tarsi 1 and 2 bear on their proximal end a tactil hair and a long olfactoric hair, and at their distal end a sucker with long peduncle, and a small claw. The tarsus 3 ends in a sable shaped hair and three spines. The tarsus 4 ends in three spines and a long hair, which is $1\frac{1}{3}$ as long as the leg 4 itself.

Habitat: *Necrophorus humator*.

Patria: Germany. (Bremen, S. A. POPPE).

24. Key to the species of *Anoetus* Duj.

Hypopi.

- | | | | |
|----|---|---|---------------------------------|
| 1. | { | Before the Cphth. a rounded epistome | A. pulchrum (Kram.) |
| | { | No epistome | 2 |
| 2. | { | Cephth. excavated ant.; dors. hairs long. | A. phyllotrichus (Berl.) |
| | { | Cephth. rounded ant.; dors. hairs short | 3 |
| 3. | { | Sucker-plate with 4 suckers | A. muscarum (L.) |
| | { | Sucker-plate with 8 suckers | 4 |
| 4. | { | Tarsus 1 without pedunculated sucker | A. spiniferum (Michael.) |
| | { | Tarsus 1 with pedunculated sucker | 5 |
| 5. | { | Tarsus 2 with pedunculated sucker | A. neglectus Oudms. |
| | { | Tarsus 2 without such | 6 |

6. { Last pair of suckers flanked by
 a spine. *A. dugesi* (Clap.)
 Last pair of suckers not flanked
 by such *A. berghi* (Jensen). *A. feroniarum* (Duf.), *A. fimetarius* (Can. et Berl.), and *A. julorum* (C. L. Koch).

25. Remarks on the hypopi of *Anoetus*.

With the present knowledge, short descriptions and badly drawn figures I am unable to discover any differences between the hypopi of the lastnamed four species.

1. *Anoetus muscarum* (L.). CANESTRINI (Prosp. Acarof. Ital. v. 3, p. 369) says: « L'apparato di aderenza si compone di otto ventose » etc. In fact we must say: there is a large sucker-plate with 4 suckers, 2 very small ones before and 2 very large ones behind the anus. Before the sucker plate is the genital aperture, and when the genital covers are open, 4 genital suckers are visible. There are no suckers near the coxae 2, 3 and 4, nor to the sides of the genital aperture.

2. *Anoetus julorum* (C. L. Koch). CANESTRINI (Prosp. Acarof. Ital. v. 3, p. 371) tells us: « il quarto articolo delle zampe medesime » (=del primo paio) « ha all'estremità anteriore e due clave sensorie. » This is not exact. The two sensorial hairs are planted on the proximal end of the *quarto* article of the leg. — Further: « Tutte le zampe sono terminate, oltre che da una unghia e da una ventosa » This is inexact too, for there is no question of suckers on legs 2, 3 and 4. If this be true, why has he not delineated them in his figure on Plate 31 ? — Further: « L'apparato di adesione si compone di dieci ventose », etc. We must read this passage as follows: The sucker-plate has 8 suckers, ranged 2, 4, 2, of which the two central ones are slightly larger than the others. Before the sucker-plate is the genital split which, when it is open, does not show any internal suckers. This split is flanked posteriorly by a very minute spine on each side, which, when seen on its top, shows itself as a small circle (see a. o. JENSEN's figure of *Anoetus*

berghi). Moreover there are suckers near the coxae 2, 3 and 4, the latter flanking the genital opening. The anus is behind the foremost pair of the suckerplate. — This description is also applicable to the traveling nymph of *Anoetus bergi* Jensen.

3. *Anoetus fimetarius* (Can. et Berl.). The description of CANESTRINI (Prosp. Acarof. Ital. v. 3, p. 374) is also applicable to *Anoetus julorum* (C. L. Koch) and *Anoetus bergi* (Jensen). The form of the body «triangolare» is dependent from the animal having more or less sufflexed its lateral margins.

4. *Anoetus feroniarum* (Duf.). The description of CANESTRINI (Prosp. Acarof. Ital. v. 3, p. 375 and 376) perfectly fits on the traveling nymphs of the three above mentioned species.

Arnhem, 1 Nov. 1901
